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9.—*Amosopollis cruciformis* gen. et sp. nov., a Pollen Tetrad from the  
Cretaceous of Western Australia

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*Amosopollis cruciformis* gen. et sp. nov., an obligate tetrad of monosulcate pollen grains, is described from Lower and early Upper Cretaceous sediments in the Perth Basin, Western Australia. The species is of unknown affinities, but occurs also in Cretaceous sediments from Victoria and appears to have stratigraphical importance.

Introduction

Rich assemblages of spores, pollen grains, hystriosphæroids and dinoflagellates are known to occur in marine Cretaceous sediments which underlie the Molecap Greensand in the southern part of the Perth Basin, Western Australia. These strata, which are frequently glauconitic, do not outcrop and have, so far, yielded no identifiable megafossils. Their detailed stratigraphy is poorly known but they are at present correlated in a general way with the Osborne Formation, the type section of which occurs between 180 feet and 438 feet in the King Edward Street Bore, Osborne Park (McWhae, Playford, Lindner, Glenister and Balme 1958). Microplankton species from the Osborne Formation and its probable equivalents have been described in two recent papers (Cookson and Eisenack 1958, Cookson and Eisenack 1960), and from the evidence of the dinoflagellate suites, the formation is mainly of Albian-Cenomanian age. No detailed account of the palynology of the Osborne Formation has been published although Cookson (1961) has described *Hoegisporis lenticulifera* Cookson a distinctive plant microfossil which occurs in small numbers in most samples from the unit. Microfloras from the Osborne Formation are characterised by a variety of species of *Gleicheniidites*, and most of the other forms present are trilete spores or saccate pollen grains, which do not differ obviously from species known to occur in early Cretaceous and late Jurassic sediments. Most assemblages, however, contain numerous specimens of an unusual tetrad of monosulcate pollen grains, which has not been recognised in older strata, and which appears to have stratigraphical importance, at least in Western Australia. The purpose of the present note is formally to name and describe this plant microfossil.

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Storage of Material

The holotype and two of the paratypes are stored in the collections of the National Museum of Victoria (N.M.V.) and the third paratype is lodged in the general collection of the Department of Geology, University of Western Australia (U.W.A.). A bulk sample of the type material is also retained in the latter repository.

Systematic Description

Genus *Amosopollis* gen. nov.

Type species.—*Amosopollis cruciformis* sp. nov., Cretaceous, Perth Basin, Western Australia.

Diagnosis.—Pollen grains prolate, in obligate, tight, tetragonal or slightly rhomboidal tetrads. A broad, usually ragged, gaping longitudinal sulcus extends the full length of the distal face. Exine thin, surface finely granulate. Total diameter in lateral view 39-60 $\mu$ .

Remarks and comparisons.—United tetrads of colpate or porate pollen grains have been illustrated, mainly from Tertiary sediments, in many publications. The majority of forms described have been referred by their authors to living genera (e.g. Traverse 1955) or to broad form categories such as *Pollenites* (e.g. R. Potonié 1934). Pflug and Thomson (in Thomson and Pflug 1953) created the genus *Tetradopollenites* with the brief diagnosis "Pollen zu vieren vereinigt" and cited as the type species *Pollenites ericius* R. Potonié. Subsequently, the name *Tetradopollenites* has been used as a broad category to include *Classopollis* tetrads (Lantz 1958), pollen resembling that of *Typha* (Deak 1960) and tricolpate pollens of uncertain affinities (Traverse 1955). Obviously the original diagnosis of *Tetradopollenites* was insufficiently precise, by modern standards, and it is inadvisable to extend its usage until the definition is amended.

Few of the existing generic names for obligate tetrads have undoubted validity. An exception is *Ricciisporites* Lundblad (= *Tetradosulcites* Erdtman), a species known to occur in the Rhaeto-Liassic of Sweden (Lundblad 1959) and the Liassic of Greenland (Erdtman 1954). A distal sulcus is present in *Ricciisporites* but the type species (*R. tuberculatus* Lundb.) has a thick, heavily clavate exine and is considerably larger than *Amosopollis*.

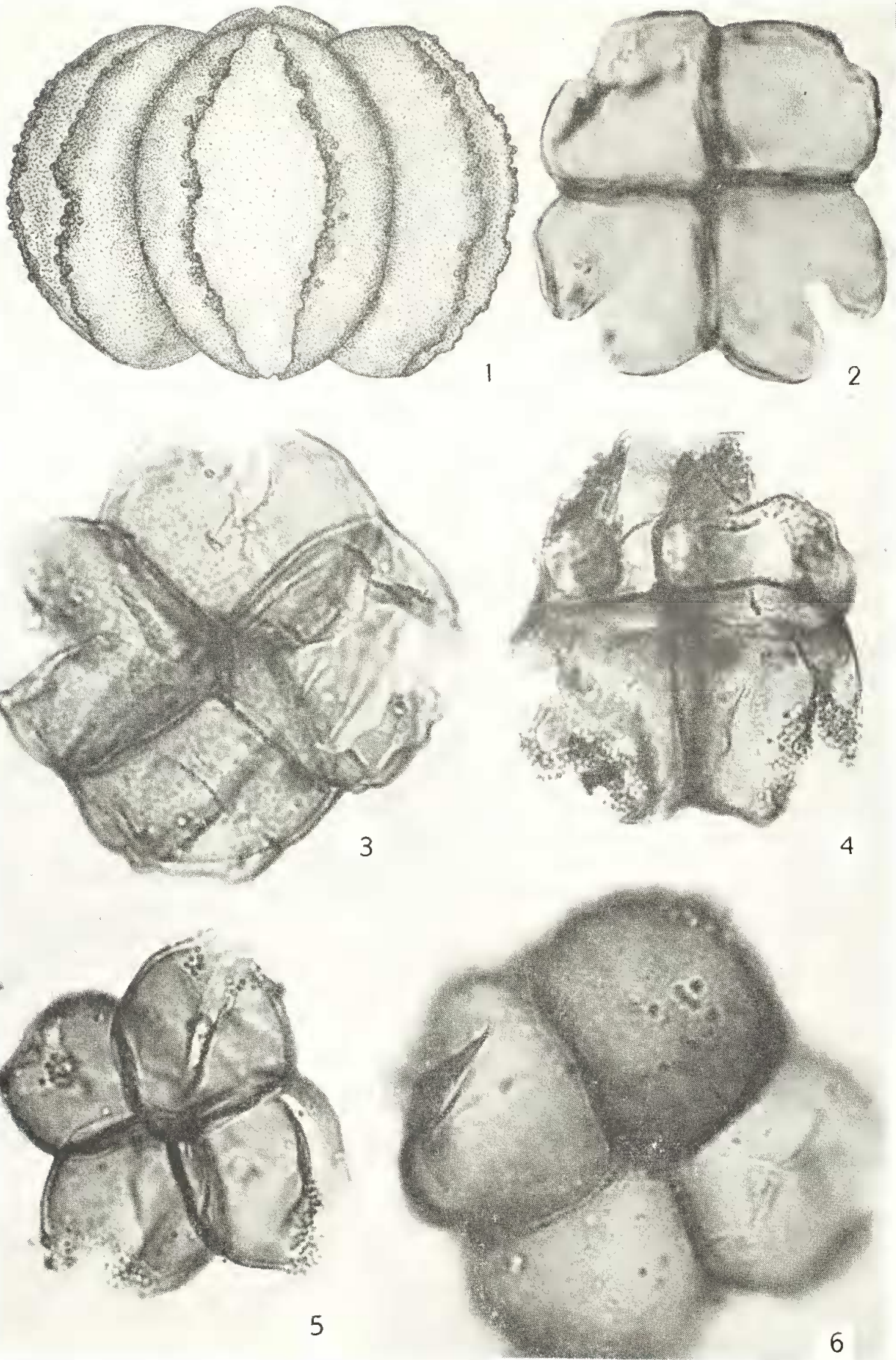


PLATE I

*Amosopollis cruciformis* Cookson and Balme

- Fig. 1.—Reconstruction of mature pollen tetrad in polar view. 1200x.  
 Fig. 2.—Paratype U.W.A. Slide 47764. Lateral view optical section. 940x.  
 Fig. 3.—Holotype N.M.V. Slide P21365. Lateral view. 1200x.  
 Fig. 4.—Paratype N.M.V. Slide P21367. Lateral view showing coarse grana along the margins of the distal sulcus. 940x.  
 Fig. 5.—Paratype N.M.V. Slide P21366. 940x.  
 Fig. 6.—Specimen from Fremantle Traffic Bridge No. 2 Bore, 144 ft., showing surface texture in high focus. 1200x.

**Amosopollis cruciformis** sp. nov.

Plate 1, Figs. 1-6

Holotype: N.M.V. Slide P21365. Paratypes: N.M.V. Slides P21366 and P21367, U.W.A. Slide 47764.

Description.—Holotype preserved in lateral view, consisting of prolate pollen grains united in a slightly rhomboidal tetrad. Exine about  $1\mu$  thick, finely granulate, grana less than  $1\mu$  in diameter except along the margins of the distal sulcus where grana up to  $3\mu$  in diameter may be distinguished. Gaping longitudinal, ragged sulcus extending the full length of the distal face. Total width of holotype  $52\mu \times 52\mu$ , polar diameter of individual grains  $26 - 27\mu$ .

In paratypes P21366 and P21367 the development of coarser grana along the margins of the distal sulcus can be clearly seen. These localized coarse grana are characteristic of *Amosopollis cruciformis*, although it is uncertain whether they represent true sculptural elements or general breakdown of the exine during dehiscence.

Dimensions.—Total diameter in lateral view  $39 - 60\mu$ ; length of individual grains  $26 - 43\mu$  (20 measured specimens).

Locus typicus.—West Australian Petroleum Pty., Ltd., seismic shot hole B1, 4 miles north of Gingin, Western Australia. Dark green, glauconitic, sandy shale from 190 - 220 ft. (Sample U.W.A. 43985). ? Albian-Cenomanian (Cookson and Eisenack 1960).

Known stratigraphic range in Western Australia.—Albian (perhaps late Aptian)—Cenomanian.

Remarks.—*Amosopollis cruciformis* is easily recognised even in poor states of preservation, and has been found in almost all samples from the Osborne Formation and its presumed correlatives. It is seldom common, but its form is sufficiently distinctive to enable its easy recognition in low concentrations. It would be unwise to speculate as to the affinities of *Amosopollis cruciformis*. Morphographically it resembles in some ways the pollen of certain living monocotyledons, but an angiospermous origin seems unlikely from the evidence of its associated microfossils. None of the other microfloral elements in assemblages from the Osborne Formation suggests an angiosperm component in the Albian-Cenomanian floras of south-west Western Australia.

**Distribution**

*Perth Basin*

*Perth Area*.—The species has been recorded from sediments of ? Albian-Cenomanian age (upper part of the Osborne Formation) in King

Edward Street Bore, Osborne Park, 265-295 ft.: Roberts Rd. Bore, Osborne Park, 470-490 ft.: Subiaco Bore, 358 ft., 436 ft.: Powerhouse Bore, East Perth, 478 ft. It has also been recorded in sediments of Albian or uppermost Aptian age (lower part of the Osborne Formation) in the Powerhouse Bore, East Perth, 590 ft., 640 ft.

*Fremantle District*.—It has been recorded from the ? Albian-Cenomanian rocks in Attadale Bore, 104 ft., 164 ft., 354 ft., 428 ft., 479 ft.: Fremantle Traffic Bridge No. 2 Bore, 114 ft., 144 ft., 168 ft., 173 ft.: Fremantle Traffic Bridge No. 5 Bore, 100 ft.: Hampden Rd. Bore, 398-430 ft.; and from rocks of Albian or uppermost Aptian age in Attadale Bore, 529 ft., 539 ft.: Fremantle Traffic Bridge No. 2 Bore, 220-230 ft.: Jandakot Bore, 450 ft.

*Otway Basin, Victoria*

The species has been recorded from Frome-Broken Hill Co.'s Port Campbell No. 1 Bore, 5,705-5,708 ft., 5,931-5,934 ft.; Port Campbell No. 2 Bore, 7,403-7,408 ft., 7,904-7,913 ft., 7,913-7,930 ft., 8,174-8,182 ft.; Port Campbell No. 3 Bore, 4,676-4,693 ft., 4,781-4,792 ft.; Flaxmans Hill No. 1 Bore, 6,375-6,391 ft., 6,663 ft., 7,200 ft.

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